"ACTIVITY BASED COSTING IN THE INFORMATION AGE"

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I. Traditional costing today

Despite the fact that it is over 75 years old, most companies still use standard cost systems both to value inventory for financial statement purposes and for many other management purposes as well. While it has some advantages for financial statement purposes (simplicity, consistency, well understood by auditors), it is, at best, meaningless and, at worst, misleading as a tool to assist in making effective management decisions.

Why is this true? It's because the business case for which it is being used today is not the business case for which it was designed. Standard cost accounting was designed for a company that had: 1) homogeneous products, 2) large direct costs compared to indirect costs, 3) limited ability to collect data and 4) low "below the line" costs. Today's company typically has 1) a wide variety and complexity of products and services, 2) high overhead costs compared to direct labor, 3) an overabundance of data and 4) substantial non product costs that can dramatically affect true product, distribution channel and customer profitability.

The typical manufacturing company is still arbitrarily attaching overhead to products using Direct Labor as the driver. They are often allocating the largest cost (overhead) based on the smallest (direct labor). Because of product variety and product line complexity, one homogeneous overhead rate is no longer an appropriate average. Finally, today, we have high tech, high-speed data collection and reporting tools. With the proper system, gathering and manipulation of data in multiple complex ways is no longer an issue.

With these tools at the disposal of a business organization, why still use a cost accounting system that was developed over 70 years ago? With the advent of certified financial statements, accounting systems became more structured to comply with the demands of external stakeholders (e.g. shareholders, governments, lenders, etc.) and the purpose of cost accounting systems changed along with the rest of accounting. The primary purpose of cost accounting in the financial accounting system today is to value inventory for financial statement purposes, not, as it was in 1924, a tool to aid in sound business decisions.

The shortcomings of traditional cost accounting for evaluating business organization effectiveness are clear:

- Because of the "leveraging effect" of direct labor overhead application (e.g. $3 of overhead "reduction" for every $1 of direct labor reduction), there is a continuing emphasis on direct labor reduction. Overhead spirals out of control while companies work to squeeze the last penny out of direct labor on the mistaken assumption that each penny reduction will reduce product cost by $0.04.

- The arbitrary application of overhead, the largest component (sometimes more than 50%) of cost, means that there is little true knowledge of product cost. Since most companies use cost to calculate the pricing required to meet profit margin goals, there is little or no information on true product profitability.

- Arbitrary costs lead to incorrect make/buy decisions. Incorrect prediction of which costs will go away and which will remain (and perhaps increase!) when changing from make to buy can cause total product cost actually to increase when the cost system predicts that cost will decrease. Traditional cost systems apply no overhead to purchased materials, parts and assemblies which distort projected cost reduction analysis.

- Since overhead resources are used by different products and product lines at substantially different rates, a change in product mix can lead to dramatically cost changes that will not be predicted accurately by traditional cost systems.

- Traditional cost accounting provides little information beyond material and direct labor to assist management to control costs at the product level or below. The primary management information tool, variances, is easily manipulated and probably of dubious value even if not manipulated. Managing variances can cause the following:
    - Purchase price variance can cause buyers to focus on price to the exclusion of quality or service. This leads to additional costs of poor quality, costs of delays and costs of excess inventory.
    - Overhead rates are set based on predicted volumes and can be manipulated to yield favorable variances by increasing production beyond what is required, increasing inventories.

- Traditional cost accounting provides no guidance to the manager on the effect of sales, marketing, distribution and customer costs on product or product line profitability. Traditional cost systems can show two customers as having the same "gross profit" when it’s obvious that the support costs of these two customers differ widely.

- If traditional cost accounting is an ineffective management tool for manufacturing companies, the problem is substantially worse for service organizations.
    - Distribution organizations typically carry items they distribute at cost and do not differentiate overhead process costs by product, customer or distribution channel. Thus no information on true product, product mix, distribution channel or customer profitability can be obtained. The only thing that can be known is overall profitability or loss.
    - Service organizations with no "product" often only have available total revenue, a summary of expenses and the resulting profit or loss. Specific services aren’t identified and costed in any way. Thus, management had no tools whatever with which to make proper service mix and service profitability decisions.

Although some advocate a more complex system for financial accounting that fulfills the needs of both the financial statement (external accounting) and management (internal) accounting, this is a needless complication. What is required are two systems, the continuation of the existing cost system to value inventory for financial accounting and a more sophisticated management accounting system that takes advantage of the data collection and manipulation tools that are available and be designed to reflect the business complexity that exists today. Because these systems have different purposes, the financial accounting system and management accounting system do not have to have the same structure. They need only to be connected by a common data base to insure that all costs that are collected by the financial accounting system are used in the management accounting system. Financial accounting will continue to be used for its primary purpose, external stakeholders, while the management accounting system will provide information for operating and improving the business. Financial accounting is historic while management accounting must be predictive.

The reason for a separate management accounting system is simple. To provide management information that is most useful, a system must be designed that most closely reflects the business process, unconstrained by what are, for internal purposes, the artificial rules of GAAP. These rules certainly have value for clear representation of financial statements for external purposes, but they limit the ability to match the management cost system with the business process.

There are some additional characteristics that would be desirable in a management cost system. The service component of many manufacturing companies has become substantial. In addition, many organizations have no manufactured product in the traditional sense, but still have processes and products that need costed (e.g. information "products", distribution "products", service "products"). An effective management cost system should handle these.

Finally, there are many costs that are "below the line" in a traditional cost system and are not differentiated by product. These include sales, marketing, advertising and administrative functions. In many manufacturing and non manufacturing companies, these costs represent a substantial part of the total value chain cost. The management cost system should address these issues as well.

II. ACTIVITY BASED COSTING

A. Definition

"A method of measuring the cost and performance of activities and cost objects. Assigns cost to activities based on their use of resources and assigns cost to cost objects based on their use of activities. ABC recognizes the causal relationship of cost drivers to activities."
-- Peter B. B. Turney

B. Differences between Traditional and Activity Based Costing

Traditional cost models apply resources to products in two ways. So called direct costs like material and direct labor are attributed directly to the product and other resources are arbitrarily allocated to the product, typically through the mechanism of direct labor hours, labor dollars or machine hours. Sales, marketing and administrative costs are not included in product costs.

Activity Based Costing (ABC) does not change the way material and direct labor are attributed to manufactured products with the exception that direct labor loses its special place as a surrogate application method for overhead resources. Direct labor is considered another cost pool to be assigned to processes and products in a meaningful manner, no different than any other resource.

The primary task of activity based costing is to break out indirect activities into meaningful pools which can then be assigned to processes in a manner which better reflects the way costs are actually incurred. The system must recognize that resources are consumed by processes or products in different proportions for each activity.

With ABC, all costs reside in resources, which are such things as material, labor, space, equipment and services. Resources are consumed by activities which have no inherent cost. The cost associated with activities represents the amount of resource they consume per unit of activity. Resources and activities are then applied to cost objects, that is, the purpose for which the resource is consumed and the activity is performed.

Each resource and activity has a unit of measure which defines the amount of the resource consumed or activity required by a unit of demand for it. Resources can be consumed by resources (e.g. office space resource is consumed by an employee resource), by activities (e.g. telephone resource is consumed by a customer service call activity) or by cost objects (e.g. material resource is consumed by a product cost object).

Activities can be performed in support of another activity (e.g. invoice printing activity supports the billing activity) or in response to a cost object (e.g. purchase orders are issued to support the material acquisition process). A cost object can be a process or product and either an interim cost object or an end user (customer) cost object. For example, hiring personnel may be a cost object of Human Resources Department utilizing space, utility, telephone, supply and labor resources and performing advertising, calling, interviewing and orientation activities. That cost object may be a resource used by other departments to secure labor resource for their department.

Building a network of resources, activities and cost objects defines the operational flow of the process or processes to be costed. Each resource and activity has a unit of measure which converts them at a unit of demand rate. If a cost model is to be useful and effective in determining process and product costs, it is imperative that the business process be identified and understood first. Only then can costs be attached to determine the cost of the defined process.

C. Simple Activity Cost Models

There is no one way to proceed with improving the cost system. It should be approached as a continuous improvement project with the model being developed until the resulting incremental improvements no longer justify the additional development or data collection expense. In its simplest form ABC can be nothing more than separating a major cost element from the overhead pool and assigning it to cost objects based in some less arbitrary means than direct labor. Subsequent improvements could extract other cost pools, gradually subdividing the overhead pool into 4, 5 or more pools and assigning

the costs to products using a unique measure, or driver, for each cost pool.

Models at this first level are called cost decomposition models. They primarily deconstruct the chart of account overhead cost pools to improve the product cost model. They can help address the following issues:

- Improve individual product costs or costs of product families. This can lead to :
  - Improved pricing strategies.
  - Better and more informed product mix decisions.
  - Understand how volume affects product costs.
  - Limited predictive ability for the cost of future product strategies.

- Functions for which this level of analysis is less useful include:
  - Identifying the cost of other types of cost objects, such as processes, services or customers.
  - Attaching below the line costs to the product cost model.
  - Identification of process dysfunction and process improvement.
  - Benchmarking and Business Process Reengineering.

From an implementation point of view, the advantage of cost decomposition is that improvements in product cost, sometimes dramatic, can be made relatively quickly and with little analysis. Also, the data required to run the model is typically already available and being collected somewhere in the organization. The ABC model can often be built using the existing General Ledger package or spreadsheet software. Because of these factors, it is a relatively low cost, low risk strategy. This can be valuable in an environment where the value of ABC must be "proven" or in a pilot project where few resources are allocated or available to the project.

D. More Sophisticated Cost Decomposition Models

The next step in a continuous improvement ABC model would be to begin to relate cost to process. The model ABC Company model discussed begins to create that relationship. It is still primarily a cost decomposition model since it takes cost pools from the chart of accounts and distributes them across consuming functions. However, a basic model is constructed which defines the resource-user relationship among the cost pools.

The Activity Flow Map shows that the Facilities resource is consumed by five other functions. The G & A resource is portioned into Accounts Payable which is consumed by the Material Acquisition Activity, Accounts Receivable which is consumed by the Order Processing Activity and the remaining G & A cost pool which is distributed directly to products. The Warehousing activity is also consumed by the Material Acquisition and Order Processing activities. Finally, the Purchasing resource is consumed by the Material Acquisition activity. Material Acquisition is not a functional department that can be identified by a specific box on the organization chart, chart of accounts or facility layout. It is an activity that consumes portions of other functions (resources) that can be identified in that way. Order

Processing, although consisting in part of the Order Entry function (activity) also includes the consumption of resources via the Order Picking, Shipping and Billing-A/R functions (activities).
Because this model begins to look at cost from the point of view of process, the information that results is more useful and can lead to analysis beyond product cost analysis. Examples of possible analysis are:

- Process costs for processes such as Material Acquisition and Order Processing can be identified, analyzed and used to identify potential process improvement opportunities.

- Analysis of various scenarios is possible to a limited extent. Pricing, product mix and profitability scenarios can be constructed to determine optimums and potential cost reduction opportunities resulting from reduce need for various resources and activities.

- Because Sales and Marketing and G & A cost are included in product cost, the model provides a complete product cost across the entire value chain from raw material to customer. This improves the analysis of all system characteristics mentioned above.

III. ACTIVITY BASED MANAGEMENT

A. Definition

"A discipline that focuses on the management of activities as the route to continuously improving the value received by customers and the profit achieved by providing this value. This discipline includes cost driver analysis, activity analysis and performance analysis. Activity Based Management draws on activity based costing as a major source of information."
-- Peter B. B. Turney

B. Continuous Improvement

Activity Based Costing adds the most value to an organization when it is used as the informational basis of managing and improving the business. Activity analysis leads to an Activity Based Management business model from which management can make decisions to improve the effectiveness of the organization. These improvements can take the form of incremental process improvement using Total Quality, Just-in-Time or Reengineering.
Once these changes are made, the ABM model provides mechanisms to measure the relative success of the changes implemented and make business decisions leading to further analysis and improvement.
In order for a model to accomplish these ambitious goals, even in a limited department, division or strategic business unit, it must be, first, a clear and accurate representation of the actual business process. Care must be taken to insure that the model is not a representation of "what we *think* we are or should be doing". Second, costs must be attached to the resources from the financial accounting system. Finally, the model must be verified both operationally and financially to the satisfaction of the management who will be using it to make business decisions. Only then will the model have the credibility required for management to trust it and rely on it.

C. Nine Steps to Activity Based Management

There are many ways to perform and document systems analysis. This course uses one, not because it is superior, no one can judge that, but because it is designed to address the unique problems of analyzing and creating ABM models. The methodology is general enough to be used with any modeling or ABC tool and can even be used as a framework for manual systems analysis and financial model building. The Nine Steps are as follows:

1. Define the project scope.

1. Identify activities and their drivers.
2. Lay out the process flow.
3. Collect related date and rules.
4. Identify the ABC modeling tool to be used.
5. Build the model using the selected tool.
6. Test and validate the model.
7. Analyze the model results.
8. Take Action.

D. Step One - Define the Project Scope

Defining the project scope is the key to success or failure. Unless your organization has made a major commitment to ABM, the technique will probably have to "prove itself". Indeed there may be major resistance among those of the "if it ain't broke" school of management and those who have a vested interest in maintaining the *status quo.*
Taking a long time to get results is one of the best ways to kill a project of this type. Management changes focus, project funding dries up and criticism accumulates. Therefore, unless you are a small organization or benefit from the aforementioned major commitment, it is best to start with a pilot project. The advantages of this are numerous:

- The size and time frame of the project can be managed to create rapid results and demonstrate value added.
- It provides an opportunity to evaluate the methodology without an organization wide commitment and for a reasonable cost.
- It creates a training ground for members of the pilot team.
- Rapid, dramatic results create momentum and generate management buy-in for future, larger projects.

In addition to defining the size of the project, defining the right project has a dramatic effect on project success. The following are key points to consider in order of importance:

- Focus on the business issues. What's important in the organization, what are the core competencies, where would better understanding of the cost/process relationship yield results.
- Look for functions where there is a high level of process and product diversity, such as volume, complexity, use of resources and volatility. The more diversity, the more dramatic will be the results.

- Look for functions with high indirect costs. Substantial changes in low cost activities will not attract attention. Go for the big dollars.
- Identify an area where data is readily available. Data collection can be one of the high costs of systems analysis, especially if the mechanism must be created to collect the data.
- Finally, other things being equal, select the department or function that wants to improve and is willing to work on the change. Lack of cooperation can defeat the chances of any project being successful.

It is important that there be agreement between the analysis team and management as to what is expected to be accomplished by the study.

The scope step must also define the factors cost objects that the project will attempt to define and cost. These are the demands that cause the outputs of the business process to exist. These objects can be products, product lines, customer groups, distribution channels, services, processes or even idle capacity, scrap or other non value added collector of cost.

E. Step 2 - Identify Activities, Resources and Output Measures.

Beyond the cost objects identified in Step One, additional data about the process must be collected. In order to insure that the process defined is the one actually performed, it is important to have users of the process play a key role in the data collection. Resources, activities and output measures must be identified for the process being analyzed.

Resources are things such as labor, space, utilities, material, supplies and services that are consumed in the process. Resources are the only element in the process that contain cost in and of themselves. Costs no longer are attached to the model from the chart of accounts directly to functions or activities. Costs will be attached to resources and the model, not the chart of accounts, will be the mechanism for determining how costs flow through activities to cost objects. Activities are the actions taken to fulfill the requirements of cost objects. Activities consume resources, hence costs. An output measure is the unit rate at which a resource or an activity is consumed by another resource, activity or cost object. There is one output measure per resource or activity.

The methodology for collecting activity and resource data is as follows:

- Identify activities, resources and output measures for each pilot area.
- Analyze the internal effort spent on each activity. The quickest method and the one the usually yields the highest quality data is self report.
- Identify the external support activities and resources required.
- Identify the users of the pilot area's activities (cost objects) and determine percentages of the activity they use.

F. Step 3 - Lay Out the Process Flow

The process flow is a symbolic representation of the consumption of resources in the execution of cost object. It is an organized method of representing the relationships among the resources, activities, output measures and cost objects. Anyone who has tried to understand or define a complex process without some graphic representation

immediately knows the benefit of a process flow. It helps define how the business process works. In the case of cost modeling, it also provides a mechanism for combining physical and financial flow.
The graphical model will make it much easier to determine if the process definition is complete. Once the process model is complete, it creates a vehicle for discussion and, eventually, agreement among project team members. Finally, the graphical model indicates what data needs to be collected.

G. Step 4 - Collect Data and Rules

Once the basic model is defined, data on volumes of transactions and factors of resource and activity usage must be collected. Demand volumes of cost objects will determine how much activity takes place and how much resource is utilized. If there are fixed resources in the model, the capacity of each resource must be defined. For a fixed resource (e.g. facility) the total cost of the resource must be determined. For variable resources the cost per unit of resource must be determined.
All data required for factor and volume analysis may not be readily available. If this is the case, use experts within the organization to estimate factors and volumes. These experts will most often be users. Avoid the "what it *should* be" syndrome. Another method of collecting valid data where none exists or to verify expert evaluation is to use sampling methods to collect data.

H. Step 5 – Identify the tool to be used

If you are using manual techniques to build your model, the bulk of the work will have been completed in steps 3 and 4. However, if you are using a computer tool, the model must be transferred from its manual state to whatever computer tool is being used.
There are many computer tools specifically designed for building ABC models. The websites for several of these are listed at the end of this article.

I. Step 6 – Build the Model

This is the time to verify several factors that affect the validity of the model. Make sure the model is "logical". Review it with users for "reasonableness". Second, make sure the model is complete. Does it contain all functions and processes? Are all activities and resources represented? Does each of them have a unit of output measure, a factor and a cost? Are fixed capacities defined?

J. Step 7 - Validate and test the model

Once the model has be verified for reasonableness, it must be validated against reliable historical data to insure it accurately reflects the pilot area. If the business has a variable demand pattern, the model must be tested at different volumes or seasonal levels. Before testing it financially, it must be tested operationally. If it is not operationally valid, it will not be financially valid.
Model validation can be enhanced if data is collected in different ways so comparisons are possible. For example, collecting percentages of time spent on each activity can be compared with the total of the time per activity multiplied by the number of activities performed in the model time horizon. In this way you can use different sources of data to verify that there is true understanding among users of how long a task really takes.

J. Step 8 – Analyze the results

Linking of financial and operational activity information allows a new view of performance measures and provides a great deal of information not available from either the traditional cost system or existing operational reports. Initially, the model can be used to compare activity based cost information to traditional costing information.

Both operational and financial information will be improved. Resources that are underutilized can be identified and may indicate inefficiencies and high idle capacity costs. Operational measures of resource consumption can be identified along with the amount of resource being consumed by non value added activities.

On the financial side, a cost object can be defined as any demand, activity, idle capacity or variable resource. This allows the organization to analyze percent of value added cost and compare it to costs of resources consumed by such items as rework, material movement, order changes and engineering change orders.

Unit costs of activities and processes can also be calculated, such as cost per setup, cost per order, cost per item or part picked and cost per engineering change order. All of this new information will suggest strategy, organizational, tactical, process, quality and continuous improvement changes.

K. Step 9 – Take Action

Activity Based Management requires that an organizational cost/process model be build which provides enough information to manage the department, division, strategic business unit or company. In the case of a pilot project, ABM can be performed on the function covered by the pilot.

The budgeting function can now have a process based orientation. Activity unit costs can be multiplied by projected activity volumes to determine a budget baseline. Unit cost improvements can be negotiated to set a new activity based budget. Reductions of non value added activities, both in terms of unit cost and activity volume can be projected and the new budgeted sum can be factored into the department budget. Budget versus actual can be tracked based on actual volume of activities and their costs versus budget and the budget can be adjusted if the volumes warrant it. The entire budget and budget measurement process can be rationalized to replace the "what did we do last year and how much can we increase it" process that often is found in many business organizations.

Strategic issues can also be addressed. Markets to enter, increase or abandon can be evaluated based on the effect of the change on profitability, whether the business has adequate resources to accommodate the change and what additional capital, project or training costs might be incurred. Product mix, make/buy, expansion and downsizing decisions can also be evaluated based on affect on the business process and attendant costs.

L. The project team

Building ABC models and practicing ABM are team sports. There are many reasons for this. The complexity of most business processes requires a variety of people who 1) are familiar with the process being studied, 2) possess the analytical skills necessary to build the model and 3) understand the financial system well enough to attach costs correctly to the process model.

A second reason for a team approach is buy in. Functions consulted on a project and made a part of its design and implementation team are more likely to accept, believe and use the result. Third, people who are involved with and users of a particular activity are best equipped to define it, understand it and explain it to others.

Fourth, the decision makers must understand the model and its benefits if they are to be expected to proceed from the pilot to further development and, ultimately, to use the model to run the business. Finally, experienced people will be required to implement the recommendations and expand the model beyond the pilot phase. Team members will become the core group for future development and use of the ABM model.

Outsiders can also play a role in the development of ABC and implementation of ABM. Consultants can bring in a skill set and experience level lacking in an organization just starting on the ABM road. The appropriate use of consultants is to train organization team members in the use of ABC and modeling techniques. Beyond that consultants can act as team facilitators and resident experts. Their role is knowledge transfer and helping keep the team focused. Under no circumstances should they take the primary role in analysis and model development. This approach runs the risk of creating a model that no one in the organization understands. This increases the risk of a lack of buy-in by the organization, misuse of the model and information it generates and a model that does not accurately represent the business process.

v. CONCLUSION

A. System integration

The activity based model bridges the gap between the financial system and the various operational system of the organization. Properly designed and implemented, it can provide better information for decision making and business improvement than either of those systems because it contains both operational and financial data built into a model that reflects how the business actually operates.

Model expansion and improvement will probably be performed continuously, at least until the model is providing a level of information throughout the organization deemed acceptable to make the types of decisions required of it.

Although the initial pilot can sometimes be build manually and, in a small company with a cost deconstruction model, can be maintained manually, for most organizations a computer tool will be necessary to get to the sophistication required to provide the quality of information desired. In this case, it can be helpful if the computer tool has the ability to download information from the legacy systems in the company and manipulate it so that it can be input directly to the model without human intervention.

B. The road to successful ABM

The road to successful ABM implementation is paved with knowledge. A clear understanding of Activity Based Costing principles is essential. Too often, someone in the organization hears the three letter acronym (ABC) and it becomes the organization's three letter acronym of the month. Knowing what ABC is, how it works, how it improves the information system and how it is used to improve business operations

is critical to success. Thus, signposts on the road to success are as follows:

- Training in the understanding of the principles of ABC and ABM.
- A clear understanding of how and where these principle can be applied to the business.
- A thorough knowledge of the business process as provided by users; what is actually done and how.
- Financial people that can relate the business process to the organization financial data.
- A practical methodology for design and implementation of an ABC model.
- A software tool that contains all the elements necessary to support an ABC model that integrates both operations and financial data.
- A multi disciplined team of committed company people supported by training, facilitation and expertise of outsiders if necessary.
- Top management understanding and support.

Appendix A – Activity Based Costing software developer websites

Armstrong Laing, Ltd.
www.armstronglaing.com
ABC Technologies
www.abctech.com
QPR Management Software
www.qprsoftware.com
Hyperion Activity Based Management Software
www.hyperion.com/habm.cfm
Acorn Systems, Inc.
www.acornsys.com/home.html